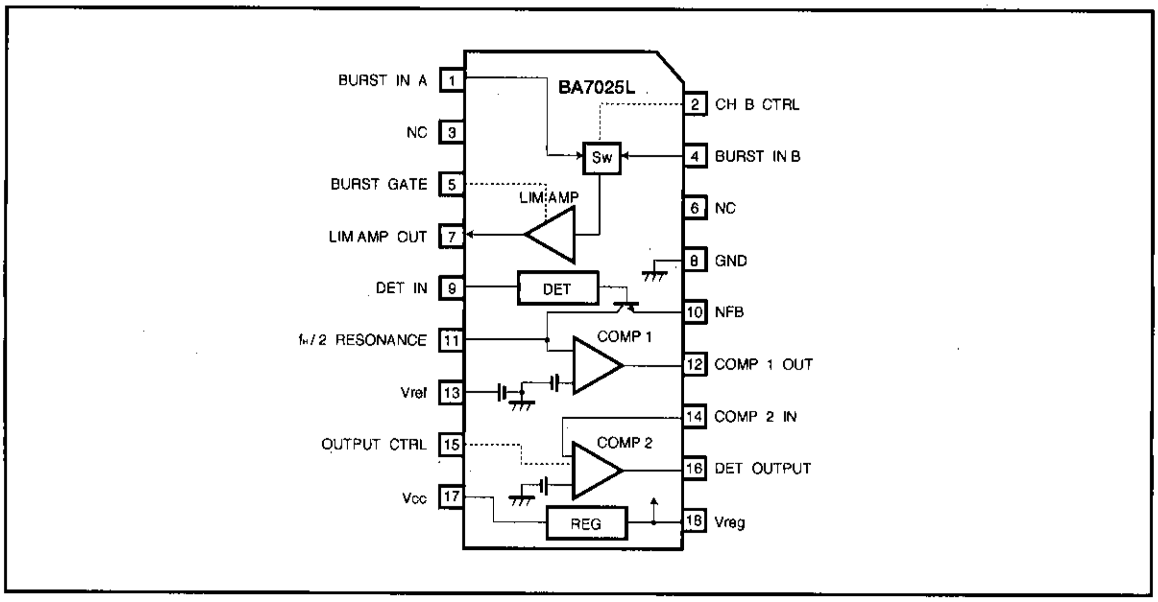
SECAM discriminator IC
BA7025L

The BA7025L incorporates a PAL/SECAM discriminator circuit on a single IC. It is ideal for use in video cassette recorders and televisions. By adding a ceramic filter, an LC circuit for $f_H/2$ resonance, and a few resistors and capacitors, it is possible to construct an extremely sensitive PAL/SECAM discriminator circuit. The BA7025L has two burst input terminals and a built-in switching circuit that switches between inputs depending on the mode.
An output control terminal is provided to force SECAM operation and prevent erroneous operation when reception is weak. The BA7025L can operate off either 5V or 9V.

●Applications
Video cassette recorders and televisions

●Features
1) PWM integration used to give a large noise margin, and ensure a high-sensitivity discriminator circuit that is extremely stable with respect to fluctuation in the burst signal input level.
2) Low sensitivity variation means adjustment can be dispensed with.
3) Built-in input switching circuit.
4) Built-in output control (forced SECAM).
5) Large output current capacity.
6) Minimal external components required.

●Block diagram



●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	10	V
Power dissipation	Pd	500 *	mW
Operating temperature	Topr	−25~75	℃
Storage temperature	Tstg	−55~125	℃

* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

●Electrical characteristics (Unless otherwise specified Ta=25℃ and Vcc=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Operating power supply 1	V_{CC1}	4.5	5.0	5.5	V	Pin 17 and 18: shorted	Fig.1
Operating power supply 2	V_{CC2}	7.5	9.0	10.0	V	Pin 17 and 18: open	Fig.1
Quiescent current 1	I_{Q1}	−	8.0	12.0	mA	Limiter amplifier off, no input to channel A	Fig.1
Quiescent current 2	I_{Q2}	−	12.5	18.5	mA	Limiter amplifier on, no input to channel A	Fig.1
Regulator output voltage	V_{reg}	5.3	6.1	6.9	V	Pin 17 and 18: open, V_{CC} = 9V	Fig.1
Limiter amplifier gain	G_V	19.0	22.5	26.0	dB	V_{IA} (V_{IB}) =0.1V_{P-P}, 10kHz, R_T=100kΩ	Fig.1
Limiter amplifier output limit level	V_{O7S}	1.1	1.5	1.9	V_{P-P}	V_{IA} (V_{IB}) =0.3V_{P-P}, 10kHz, R_P=100kΩ	Fig.1
Ch-B control threshold voltage	V_{2TH}	−	0.7	−	V	−	Fig.1
Burst gate threshold voltage	V_{5TH}	3.9	4.25	4.6	V	−	Fig.1
Vref voltage 1	V_{ref1}	3.2	3.6	4.0	V	R_{13}=100kΩ	Fig.1
Vref voltage 2	V_{ref2}	V_{ref}	−	V_{ref}+0.2	V	R_{13}=10MΩ, Pin 11 and 13: 220Ω	Fig.1
Tuning amplifier output voltage	V_{O11}	0.8	1.35	2.0	V_{P-P}	f=10kHz, 0.2V_{P-P}, R_C=220Ω, R_E=39Ω	Fig.1
Output control threshold voltage	V_{15TH}	−	0.7	−	V	−	Fig.1
COMP 1 input threshold voltage	V_{11TH}	−	4.3	−	V	−	Fig.1
COMP 1 output voltage	V_{12H}	3.6	4.3	−	V	$V_{IN11} \gg V_{11TH}$, R_L=28.9kΩ	Fig.1
COMP 2 input threshold voltage	V_{14TH}	−	3.5	−	V	−	Fig.1
DET OUT output voltage	V_{16H}	3.6	4.3	−	V	$V_{IN14} \gg V_{14TH}$, R_L=470Ω	Fig.1
DET OUT leakage current	I_{16L}	−	0	5.0	μA	$V_{IN14} \gg V_{14TH}$, R_L=100kΩ	Fig.1

●Mesurement circuit

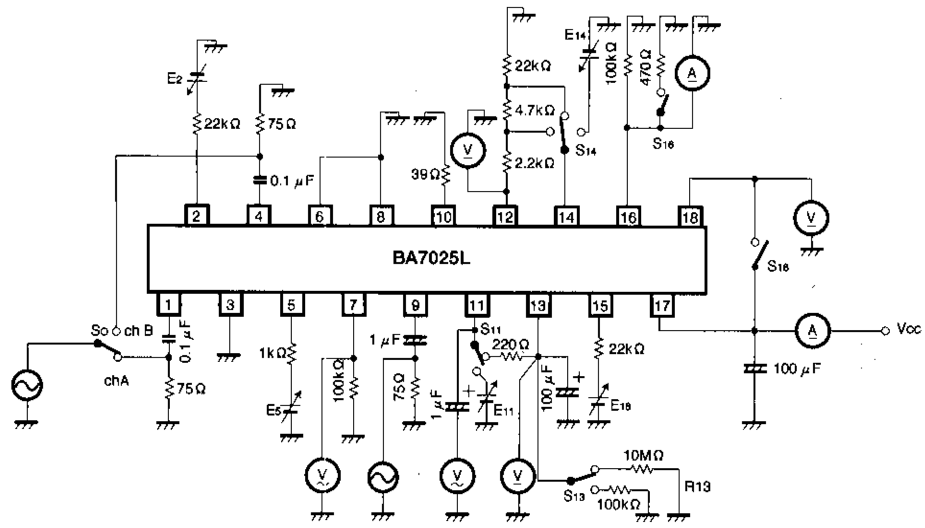


Fig.1

●Application example

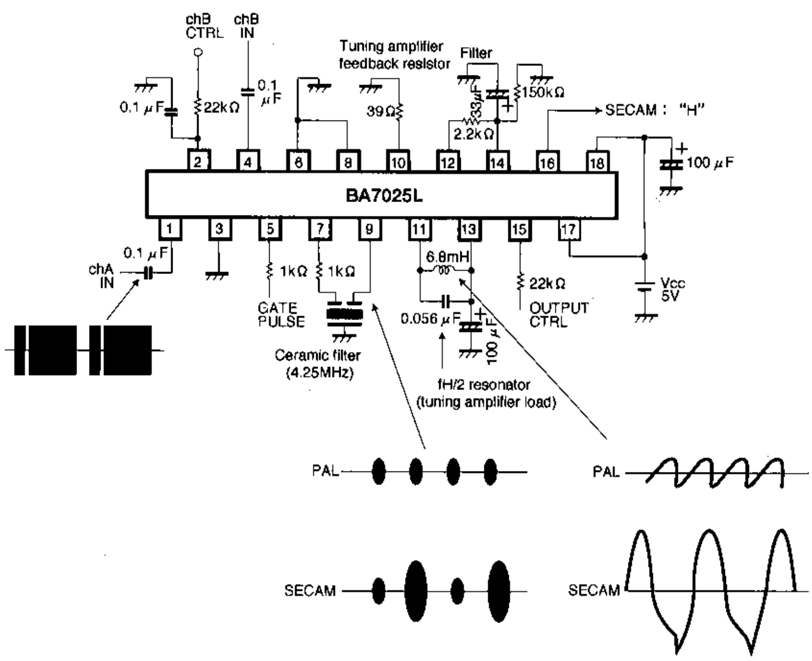
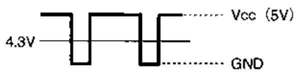


Fig.2

●Application example notes

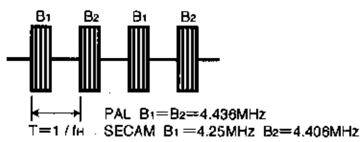
(1) ch A IN and ch B IN
Chroma signal inputs (cut the luminance signal)
(2) ch B CTRL
When "H" (Vcc) ch B is selected, and when "L" (GND) ch A is selected.
(3) Unused pins
Pins 3 and 6 are not used. Connect them to GND to reduce crosstalk between channels.
(4) GATE PULSE
The burst signal is extracted from the input chroma signal. The gate pulse has negative polarity.



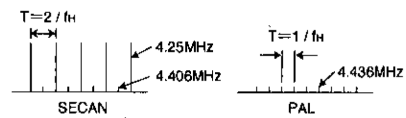
(5) Ceramic filter
A 4.25MHz filter is the most suitable. The value of the nominal 1kΩ resistor connected to pin 7 should be matched to the filter impedance.
(6) $f_H/2$ resonant frequency
Resonant LC circuit tuned to $f_H/2$. The amplitude is controlled by the value of the feedback resistor connected to pin 10.
(7) Filter
This filter integrates the tuning detection pulses output from comparator 1 (pin 12). The threshold level of comparator 2 (pin 14) is approximately 3.8V (Vcc=5V).
(8) OUT CTRL
SECAM mode operation is forced when this is "H". The 22kΩ resistor is for current limiting. The switch threshold level is V_F (approximately 0.6V).
(9) When a 5V power supply is used, short pins 17 and 18. When a 9V power supply is used, the pins are not shorted, and pin 17 is connected to the 9V supply.

●Circuit operation

(1) Chroma signal input
The chroma signal is input on pin 1 or pin 4. The burst signal (referred to as the unmodulated carrier in the case of SECAM) is extracted in synchronous with the gate pulse signal input from pin 5.



The BA7025L discriminates between PAL and SECAM signals by detecting the presence or absence of the 4.25MHz SECAM burst signal.
(2) Limiter amplifier
This amplifier increases the level of the burst signal extracted from the chroma signal to that required for normal signal processing by the following stages. The amplified signal is fed to the detector stage. The limiter amplifier is used to extend the operating input range.
To prevent color signals other than the burst signal from being amplified when in stop mode, or in the case of large inputs, the limiter amplifier only operates for the interval of the pin 5 extraction pulse to prevent erroneous discrimination.
(3) 4.25MHz filter
The PAL/SECAM burst signal amplified by the limiter amplifier is fed through the 4.25MHz filter connected between pins 7 and 9 to attenuate the 4.4MHz frequency component.
(4) Detector stage
The detector stage uses a second-order method to improve the detection sensitivity by improving the signal-to-noise ratio.



Output after detection

(5) Tuning amplifier
Connect a parallel LC resonant circuit to pin 11 toterminalconstruct the tuning amplifier. By tuning the circuit to resonate at $f_H/2$ (approximately 8kHz) the 8kHz frequency component of the SECAM burst signal detected at the detector stage is selected and amplified. The gain of the amplifier is set by the negative-feedback resistor connected to pin 10 and the resonant impedance.

(6) Comparator 1, integrator circuit and comparator 2
The output from the tuning amplifier is compared to the reference level by comparator 1, and converted to a pulse waveform. This waveform is integrated by the integrator circuit connected between pins 12 and 14, and the output of the integrator circuit is compared to the reference voltage by comparator 2 to discriminate between PAL and SECAM. The discriminator output signal ("H" or "L") is output on pin 16.

(7) Input/output circuits
Equivalent input and output circuits are given in Fig. 3.

●Input/output circuits

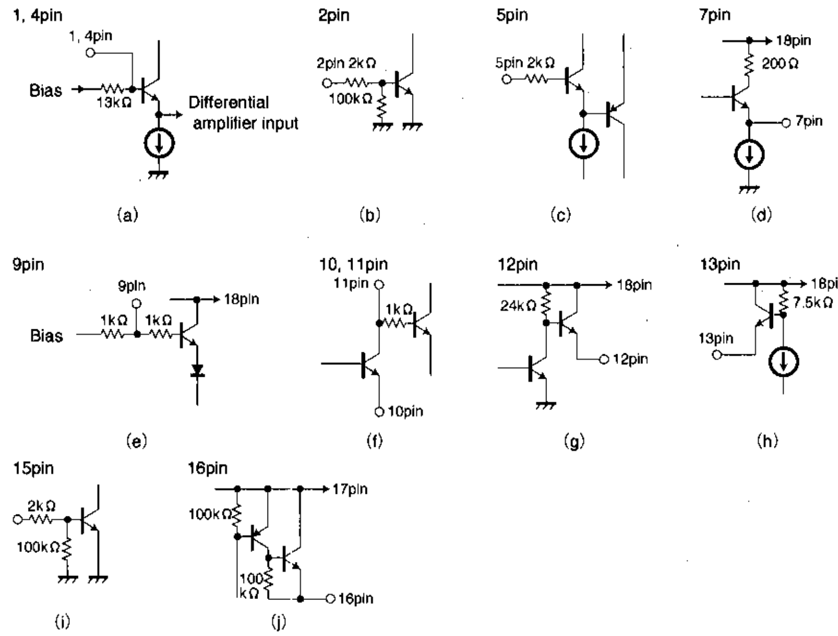


Fig.3

●Electrical characteristic curves

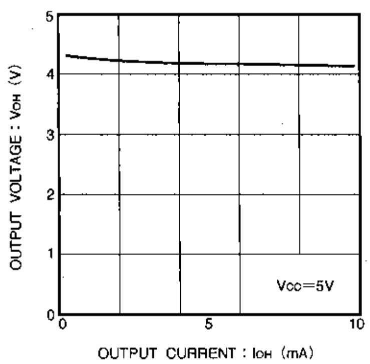


Fig. 4 Pin 16 output voltage vs. output current characteristic

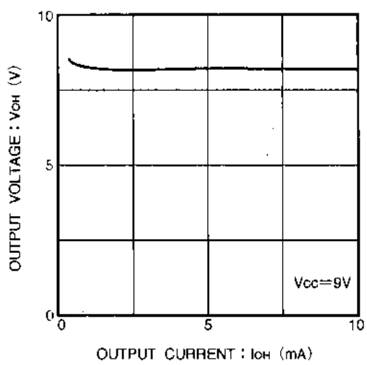
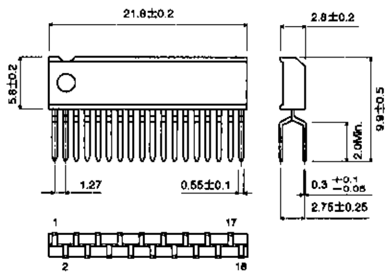


Fig. 5 Pin 16 output voltage vs. output current characteristic

●External dimensions (Units: mm)



ZIP18